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CLAIMS

What Is Claimed Is:

1. A method for imaging a three-dimensional data volume, said three-dimensional data volume comprising a plurality of voxels, each voxel comprising a three-dimensional location and a dataword, said dataword being representative of a physical phenomena, said method comprising;

creating at least one three-dimensional sampling probe, wherein said at least one three-dimensional sampling probe is the same size or a subset of said three-dimensional data volume, said at least one three-dimensional sampling probe having a probe face in a probe face plane and an opposing probe face in an opposing probe face plane;

producing a plurality of control points in said probe face plane, said plurality of control points defining one or more lines on said probe face plane;

extending a ribbon section from said probe face plane toward said opposing probe face plane, one edge of said ribbon section being formed by said one or more lines; and

selectively imaging datawords representative of said physical phenomena at three-dimensional locations which intersect said ribbon section and said three-dimensional sampling probe.

2. The method of Claim 1, further comprising:

editing said plurality of control points in said face plane to thereby redefine said one or more lines, and

extending another redefined ribbon section from said probe face plane toward said opposing probe face plane.

3. The method of Claim 2, wherein said step of editing further comprises:

deleting one or more of said plurality of control points.

4. The method of Claim 2, wherein said step of editing further comprises:

changing a location of one or more of said plurality of control points.

5. The method of Claim 2, wherein said step of editing further comprises: adding one or more control points to said plurality of control points.

6. The method of Claim 1, wherein said ribbon section is perpendicular to said probe face plane.

7. The method of Claim 1, wherein said ribbon section extends from said probe face plane to said opposing probe face plane.

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8. The method of Claim 1, wherein said one or more lines comprise a plurality of straight lines.

9. The method of Claim 1, wherein said one or more lines form a closed line.

10. The method of Claim 1, wherein said ribbon section is comprised of a plurality of planes.

11. The method of Claim 1, wherein said three-dimensional probe has a plurality of side faces perpendicular to said probe face plane, said ribbon section being unparallel with respect to each of said plurality of side faces.

12. A program storage device readable by a machine, embodying a program of instructions executable by machine to perform method steps for imaging a three-dimensional data volume, said three-dimensional data volume comprising a plurality of voxels, each voxel comprising a three-dimensional location and a dataword, said dataword being representative of a physical phenomena, said method comprising;

displaying a plane within said three-dimensional data volume;

producing a plurality of control points in said plane, said plurality of control points defining one or more lines on said plane;

extending a ribbon section from said plane, one edge of said ribbon section being formed by said one or more lines; and

selectively imaging said datawords representative of said physical phenomena at three-dimensional locations which intersect said ribbon section and said three-dimensional data volume.

13. The method of Claim 12, further comprising:

editing said plurality of control points in said plane to thereby redefine said one or more lines, and

extending another redefined ribbon section from said plane toward an opposing plane.

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14. The method of Claim 13, wherein said step of editing further comprises:

deleting one or more of said plurality of control points.

15. The method of Claim 13, wherein said step of editing further comprises:

changing a location of one or more of said plurality of control points.

16. The method of Claim 13, wherein said step of editing further comprises:

adding one or more control points to said plurality of control points.

17. The method of Claim 12, wherein said ribbon section is perpendicular to said plane.

18. The method of Claim 12, wherein said ribbon section extends from said probe plane to an opposing plane.

19. The method of Claim 12, wherein said one or more lines comprise a plurality of straight lines.

20. The method of Claim 12, wherein said one or more lines form a closed line.

21. The method of Claim 12, wherein said ribbon section is comprised of a plurality of planes.

22. The method of Claim 12, wherein plane is a face plane of a three-dimensional probe which also has a plurality of side faces perpendicular to said face plane, said ribbon section being oriented so as not to be parallel to one or more of said plurality of side faces.

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23. A method for imaging a three-dimensional data volume, said three-dimensional data volume comprising a plurality of voxels, each voxel comprising a three-dimensional location and a dataword, said method comprising:

positioning a face of a probe at a first position within said three-dimensional data volume;

forming a first set of control points on said face of said probe for tracking a physical phenomena described by said three-dimensional data volume, said first set of control points defining a first spline curve;

moving said face of said probe to a second position within said three-dimensional volume;

forming a second set of control points on said face of said probe for tracking said physical phenomena, said second set of control points defining a second spline curve; and

interpolating between said first spline curve and said second spline curve to define a three dimensional surface representative of said physical phenomena.

24. The method of Claim 23, further comprising:

displaying the surface representative of said physical phenomena, said surface intersecting said first set of control points and said second set of control points.

25. The method of Claim 23, further comprising:

interpolating between said first set of control points to define said first spline curve and interpolating between said second set of control points to define said second spline curve, at least one of said first spline curve and said second spline curve being curvilinear

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26. The method of Claim 23, further comprising:

moving said face of said probe to a third position within said three-dimensional volume;

forming a third set of control points on said face of said probe for tracking said physical phenomena, said third set of control points defining a third spline curve; and

interpolating between said first spline curve, said second spline, and said third spline curve for enlarging said surface.

27. The method of Claim 23, further comprising:

editing at least one of said first set of control points and said second set of control points.

28. The method of Claim 23, further comprising:

displaying v-curves which interconnect between respective control points at said first position of said probe and said second position of said probe.

29. The method of Claim 28, further comprising:

displaying said spline curves and said v-curves, said spline curves and said v-curves forming a grid representative of said physical phenomena, said grid having a plurality of intersections between said spline curves and said v-curves.

30. The method of Claim 29, further comprising:

selecting one of said plurality of intersections, and moving said intersection to thereby edit said grid.

31. The method of Claim 29, further comprising:

selecting one of said plurality of intersections to thereby reposition said face to pass through said intersection.

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32. The method of Claim 31, further comprising:

selecting one of said second set of control points to thereby reposition said face to pass through said second set of control points.

33. A program storage device readable by a machine, embodying a program of instructions executable by machine to perform method steps for imaging a three-dimensional data volume, said three-dimensional data volume comprising a plurality of voxels, each voxel comprising a three-dimensional location and a dataword, said method comprising:

positioning a plane at a plurality of plane positions within said three-dimensional data volume;

forming a set of control points at each of said plurality of plane positions such that each of said set of control points defines a related spline curve; and

interpolating between each of said spline curves to form a surface representative of a said physical phenomena described by said three-dimensional data volume.

34. The method of Claim 33, further comprising:

displaying said surface representative of said physical phenomena, said surface intersecting each of said set of control points.

35. The method of Claim 33, further comprising:

interpolating between each of said set of control points to define said related spline curves, at least one of said related spline curves being curvilinear.

36. The method of Claim 33, further comprising:

editing one or more of said control points.

37. The method of Claim 33, further comprising:

displaying v-curves which interconnect between respective control points at said plurality of plane positions.

38. The method of Claim 37, further comprising:

displaying said spline curves and said v-curves to form a grid representative of said physical phenomena, said grid having a plurality of intersections between said spline curves and said v-curves.

39. The method of Claim 38, further comprising:

selecting one of said plurality of intersections, and moving said intersection.

40. The method of Claim 39, further comprising:

selecting one of said plurality of intersections to thereby reposition said plane to pass through said intersection.

41. The method of Claim 40, further comprising:

selecting one of said control points to thereby reposition said plane to pass through said selected one of said control points.